

Stevens (Geo. T.)

CHOREA:
ITS
CAUSE AND TREATMENT.

BY
GEORGE T. STEVENS, M.D.,
ALBANY, N. Y.

[REPRINTED FROM THE TRANSACTIONS OF THE NEW YORK ACADEMY
OF MEDICINE.]



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Read by Invitation, June 15, 1876.

NOTWITHSTANDING the labors and careful researches of many observers who have brought great patience, experience, and skill to the investigation of the subject of chorea, its nature and cause have eluded their search, and chorea has remained a scientific mystery to the present day.

In an able paper published in the London *Lancet*, in May, 1873, Dr. Anstie justly remarks: "The causation and pathology of chorea form one of the most puzzling subjects which medical inquiry has ever encountered;" and, if one compares the knowledge of the cause, treatment or pathology of the disease possessed by the medical profession to-day with that held a century ago, he will find that little advance has been made.

Commencing with the treatment, we find evidences of the uncertainty of our knowledge in the multitude of remedies. Glancing over the recent literature of the subject, we find that steel, antimony, zinc, arsenic, chloral, and strychnine, Indian hemp, apomorphia, Calabar bean, and electricity, rest in bed, and aloëtic purges, with a long list of other remedies, have their advocates, while of the greatest number of writers each seems to think that every remedy, except his own favorite, is inefficacious.

The truth is that the tendency is generally to a *quasi* recovery, and the physician who administers tonics and sedatives encourages this tendency; and, when the patient has

made the so-called recovery, the medical attendant is prone to imagine that his peculiar treatment has wrought the cure. One of the most unfortunate facts about the lack of knowledge of chorea is that one which it appears to me has been almost entirely overlooked—that a very large proportion of the cases which are supposed to have recovered are in reality doomed to a life of mental weakness, stammering speech, deformed limbs, disease of the heart, or other serious and permanent injuries, and the proportion of deaths is far from being the most serious or important consideration.

If, now, we inquire what are acknowledged to be elements in the cause of the disease, or where is its seat, we find that nothing is known of the first and little of the latter.

Once it was supposed that chorea was dependent upon spinal irritation, but more than twenty years since Dr. Reynolds pretty clearly demonstrated that the phenomena of chorea were not such as to favor the view of a spinal origin. He further argued that the phenomena of the disease seemed to point to the view that its pathological seat is the sensorimotor ganglia at the base of the brain, the corpora striata and optic thalami. Dr. Broadbent, at a later period, added new arguments to this view, and still later Dr. Hughlings Jackson adopted, in a modified form, the same theory.

In the comparatively few cases in which *post-mortem* examinations have been made of persons who were suffering from chorea at the time, or very near the time of death, either no lesions have been found, or such as have possessed little significance, until within a few years the careful researches of Dr. Hughlings Jackson suggested to him the hypothesis that the proximate cause of chorea is embolism of some of the capillary vessels supplying the corpus striatum and neighboring convolutions.

This hypothesis has attracted great attention in the scientific world, yet, notwithstanding the great authority of its distinguished originator and the weight of his ingenious and elaborate arguments, many eminent and judicious observers feel that it is by no means of universal application. Thus the

question of the cause and the pathological seat of chorea is as much a scientific puzzle as ever.

In solution of this riddle which has so long taxed the ingenuity of the scientific world, I announce the following proposition, which I believe has never in any form or part been submitted to the medical profession by another :

Chorea is a functional disturbance of the nervous system, which may give rise to organic lesions and which arises from irritation dependent upon anomalous refraction of the eye, and in a very large proportion of cases to hypermetropia. upon

In thus boldly announcing before this learned society a radically new doctrine respecting a disease which has baffled men of the greatest skill and eminence in science, I am fully aware of the danger of my position and of my responsibility to maintain my proposition ; but, in order that I may not assume more than I can hope to demonstrate, I desire at the outset to exclude from our discussion certain forms of disease which I have never seen, and which, if they are properly classed with chorea, may have, for their causes, influences entirely different from those which I believe to be active in the production of the disease as commonly known. Thus certain epidemic forms of mania and delusion have spread through certain localities affecting similarly large numbers of persons, leading them to shake and to dance, to jump and to exhibit other epidemic manifestations of nervous derangement. For the purpose of this discussion such epidemic forms of frenzy are excluded.

In support of the proposition I have announced, I shall first offer some of the clinical experiences which led me gradually, and almost unconsciously to myself, to a belief in the intimate relations between chorea and erroneous refraction ; then some observations which I have made with a view of testing the correctness of this theory, and finally I shall endeavor to show that this is a most reasonable and natural conclusion.

The first instance in which my attention was specially directed to the coexistence of chorea and defective refraction was in the case of a little boy, who, five years ago, was pre-

sented at one of my clinical lectures at the Albany Medical College. The boy had suddenly suffered a great loss of vision, and on ophthalmoscopic examination it was found he had apoplexy of the retina in both eyes, and that he had also a high degree of hypermetropia. It was also discovered that he was suffering severely from chorea. I was at the time disposed to regard the retinal apoplexy as in some way the result of the choreic affection, but considered the hypermetropia as a coincidence of no special significance so far as the more serious feature in the case was concerned.

Within a few weeks after this incident, a bright girl, nine years of age, was brought to me by her father, from Vermont. She had suffered pain over the eyes, on account of which, some months previously, she had been removed from school. About the same time she had been taken with chorea. I found the child suffering from a hypermetropia of $\frac{1}{10}$, and prescribed glasses to meet this indication. The child, who was greatly delighted with the improved sight, was left under my charge for about three weeks, at the expiration of which time she returned home, every symptom of chorea having disappeared. Indeed, from the time the glasses were supplied a great improvement was visible.

Several other cases came under my observation from time to time, of which I will only specially mention two or three.

Mrs. V. H., of Massachusetts, brought to me her little son, seven years of age, she being concerned because the lad was getting a cast in his eyes. She wished to know if nothing could be done to prevent him from becoming permanently cross-eyed, and also if any relief could be afforded for his painfully nervous condition. While examining the boy's eyes by the ophthalmoscope, I observed that he was so restless that he could scarcely be kept on his stool. It was an undoubted case of chorea. The boy was, as I anticipated, hypermetropic, and convex glasses were prescribed with a view to prevent strabismus. Three months later the mother and boy called on me again. The child's appearance was greatly improved, and the mother reported that he was so much pleased with

his glasses that he would only permit her to remove them at night after he had gone to sleep. His nervous symptoms had entirely disappeared and the tendency to strabismus was also relieved.

After observing several cases similar to those already related, I came to regard the hypermetropia as the exciting cause of chorea when they were coincident, and was accustomed in such cases to assure the parents that the nervous symptoms would disappear on relieving the strain upon the accommodation; but for two years past I have regarded the coincidence of chorea and anomalous refraction as unfailing, and have frequently expressed this view in my lectures to medical students.

During the summer of 1875, a lady, who was a neighbor, brought to my country residence her little girl, aged about seven years, to consult me in regard to her chorea. Having at hand neither trial glasses nor ophthalmoscope, I advised the mother to have the child's eyes examined as soon as possible, assuring her that she was oversighted, although I had no means at hand of proving it. I saw no more of the child, but was informed on good authority that she was brought to a distinguished ophthalmic surgeon in New York, who advised the mother that the child was hypermetropic and should wear glasses.

A woman in Troy, New York, brought her daughter, Carrie T., aged twelve, desiring me to prescribe for her chorea. She had observed no particular trouble about the eyes. I found hypermetropia $\frac{1}{6}$ and prescribed spectacles. I saw the girl several times afterward and had the satisfaction of seeing the symptoms of chorea rapidly disappear until the patient seemed entirely well.

I must not pass this portion of my subject without mention of two cases in which the refraction differed from that in the preceding cases.

Mr. F. A. R., of Minnesota, consulted me in September last in regard to his little daughter's eyes. She was a bright girl of ten years, with a defect in her speech, and appeared quite

restless and nervous. The trouble for which I was consulted was the presence of a number of small ulcers at the border of the cornea. Observing her restless appearance, I questioned the father in regard to the health of the child, and learned that for more than a year she had been kept from school on account of her nervous condition. She was fidgety and restless and complained that at times she suffered from headaches. Her father said that from time to time, but not always, she had twitchings of the head and of the face. She was clumsy with her hands and stumbled in walking. Her temper, by nature most amiable, had become irritable and sullen, and she would often give herself over to violent passion or to floods of tears on the most trivial provocation. On testing the refraction of the eyes I found astigmatism, which required for its correction a $+36$ cylindrical glass. After brief treatment for the ulcers of the cornea, resulting in their cure, the father returned with his child to his Western home. In the latter part of March of this year he presented the child again for treatment, she being again subject to corneal ulcers. I learned that from the time of leaving Albany the child's health had greatly improved; her nervous symptoms disappeared almost entirely, and so great was the improvement in her general health that it was a subject of universal congratulation among her friends. A month or two ago, however, her glasses were broken and she was without them for some time. The nervous symptoms began to return and the corneæ were again affected with ulcers.

A female operative in a knitting-mill in Cohoes, aged twenty, had chronic chorea, was rather feeble-minded, and had pain about the eyes. I found the right eye having astigmatism requiring a -24 cylindrical glass; with this, sight was only $\frac{5}{20}$. The left eye was emmetropic and sight good. There was insufficiency of the internal recti muscles.

Notwithstanding the fact that the relations between chorea and anomalous refraction have for a considerable time been recognized by me, and that I have for two years past spoken of this relation in my lectures, it was only in March last that

I instituted any course of systematic investigations with a view of testing more thoroughly the truth of the hypothesis which had, up to that time, grown upon me almost unconsciously. On turning over the pages of my case-books, I found that within five years I had observed thirteen cases of chorea, in all of which hypermetropia existed, except in two instances in which there was astigmatism.¹ Several of these cases had experienced the greatest relief from the use of appropriate glasses. Indeed, in no instance in which glasses had been used had there been a failure to relieve the nervous troubles.

I now sought to find the state of the refraction in eyes of persons who were suffering from, or who had suffered from, undoubted attacks of chorea.

The first case in this series of observations was that of a young girl, E. C., aged thirteen, whose brother had been a patient on account of hypermetropia with astigmatism. Having known that the sister had suffered severely from several attacks of chorea, I requested of her mother the privilege of examining the girl's eyes, which the mother readily granted. Accordingly the girl came to my office accompanied by two young companions, one of whom had suffered as severely as herself from chorea. Both the girls who had had chorea could read Snellen xxx. at twenty feet, but neither could read Snellen xx. at the same distance; while the third little girl who had not had chorea could read the xx. with perfect ease. Convex 42 glasses did not aid either of the two in reading at a distance, nor did any glasses appear to improve vision at a near point. Further examination, however, the eyes being under the influence of atropine, showed both to be hypermetropic. The first of these children has since that time worn +36 glasses, and the mother, who was about to remove her from school on account of her nervous condition, is now satisfied that she can continue her studies.

¹ The cases thus recorded do not include all that have come under my observation during this time. Since the reading of this paper two such cases have been brought to my attention, for whom I had prescribed convex glasses, but which had been forgotten.

Knowing that the daughter of a friend in Amsterdam, thirty miles from Albany, a child eleven years of age, had suffered several very severe attacks of chorea, I went to that town for the purpose of examining the child's eyes, and found that she had hypermetropia $\frac{3}{30}$ with sight equal to $\frac{1}{50}$. While at Amsterdam, I called upon my friend, Dr. W. H. Robb, of that town, who kindly offered me an opportunity of examining three other cases. Not having time to see them then, I took the first opportunity to return to Amsterdam to test the refraction of these persons. One of these patients, a girl ten years old, had chorea very severely five years ago. Her speech is still so imperfect that I could scarcely make out what she was saying, except as her mother interpreted her replies to my questions. She had vision $\frac{2}{30}$ at twenty feet, and hypermetropia $\frac{1}{30}$. The second case to which the doctor introduced me was a girl aged twelve, who had chorea three years ago, and has had repeated attacks since. She walks with a halt in her gait, her joints are large, she has slight strabismus, and hypermetropia $\frac{1}{20}$. The third case was a young lady aged twenty who had had four or five attacks of chorea, each lasting about two months. The left side was in each attack affected, and she cannot, even now, use the left hand well. She still has the restless uneasy movements of one who has never fully recovered from chorea. She had myopia $\frac{1}{14}$ with a high degree of astigmatism. Not having with me conveniences for making exact tests in this last respect, the precise degree was not ascertained. A day or two after seeing these cases a man was ushered into my consulting-room, who from his gait and manner I supposed was drunk. I was about to direct the attendant to remove him when a closer observation showed that he was the subject of some peculiar nervous trouble. He was allowed to remain, and said that he had come on account of ingrowing eyelashes. He was twenty-six years old, a laborer, feeble-minded, and evidently a subject of chronic chorea. He had the characteristic features of a hypermetrop, and I found his hypermetropia to be $\frac{1}{2}$.

Remembering that five years ago I had seen a girl at the

hospital who was suffering from a bad attack of chorea, I recently sought out her father's house, and called to see her. The mother of the girl, who received me, informed me that the daughter, who was now twenty years of age, was not in, but that she was still somewhat nervous. On stating that I would be glad to examine the daughter's eyes, I was somewhat surprised to hear the mother say that her daughter could not go on the street without glasses, and I was still more surprised to learn that I had myself prescribed the glasses five years ago—a circumstance which I had entirely forgotten. The young lady called upon me next day, and I found that she had myopia $\frac{1}{3}$ with astigmatism, requiring for its correction a cylindrical glass of forty-two inches focus.

Dr. Mereness, of Albany, kindly sent me the following case for examination :

Annie B., aged seven, had chorea a year ago, and was for many weeks helpless. The right side was apparently paralyzed. Her speech was so much affected as to render her quite incapable of expressing herself. The mother informs me that she is subject to much frontal headache, and that, after looking for a few minutes at her book, the tears start in her eyes. She has a high degree of hypermetropia, and the mother, who is thirty years of age, has only $\frac{2}{40}$ vision, and requires twelve-inch convex glasses for reading.

I am indebted to Dr. Beckett, of Albany, for the four following cases :

C. H., aged twelve, is suffering from her second attack of chorea. The present attack has lasted six months, and her condition is truly distressing. Her arms, legs, and body, are in perpetual motion, and her face has an idiotic expression. Her vision is reduced to $\frac{2}{30}$, and she has hypermetropia $\frac{1}{12}$. She has also astigmatism, but it is impossible to make out its degree. She has decided congestion of the optic disk and retina.

Maggie M., aged eleven, has had chorea four years. The first attack was the immediate result of fright. Her condition was then so bad that for many months, being unable to walk,

stand, or even creep, she rolled about the floor. She has never recovered fully, and is still suffering from violent twitchings of the limbs and body. She has hypermetropia $\frac{1}{16}$. Her sight, with and without glasses, is $\frac{2}{30}$, and, as in the preceding case, there is decided congestion of optic disk and retina.

H. B. is about twenty-five years old, feeble-minded, and subject to a most severe form of chronic chorea. He has myopia and a high degree of astigmatism.

Eliza L., aged 14, is now suffering her fourth attack of chorea. Her first attack occurred four years ago, and the succeeding ones have been about a year apart. The right side has been principally affected in all the attacks, the right leg and arm being nearly paralyzed in the first two. She has pain over the eyes, says that letters run together when she reads for a short time, and, on neutralizing the accommodation with atropia, hypermetropia $\frac{1}{36}$ was found to exist.

Dr. Smith, of Albany, permitted me to examine a patient, aged fourteen, who has had several severe attacks of chorea. He has hypermetropia with a slight astigmatism.

Dr. McKown, of Albany, was kind enough to introduce me to a relative of his, a lady who had, from the time she was fourteen until she was seventeen, suffered severely from chorea. She is now thirty-five years old. On my expressing the hope that our visit might not be considered an intrusion, she replied that she was glad to see me, as she had for a long while thought of consulting me in regard to the great pain she had for years experienced in her eyes. She was wearing +30 glasses, and had suffered from a severe form of asthenopia for years. I found her highly astigmatic.

My friend Prof. W. P. Seymour, of Troy, sent me for examination Alice T., aged thirteen, who has been subject to chronic chorea for several years. She has in the left eye myopia $\frac{1}{2}$, in the right eye myopia $\frac{1}{2}$; vision in left eye, when corrected by —42 glass, is $\frac{2}{30}$, in right, when corrected by —12, $\frac{2}{30}$. There is considerable congestion of the optic disk and retina of right eye.

Mrs. P., of Albany, aged sixty, has chronic chorea, and has hypermetropia $\frac{1}{11}$.

Mrs. Kate W., of Gloversville, came with her son to have his eyes examined, as he had chorea. It required but a moment to discover that the mother was suffering quite as severely as the child. On inquiry, I learned from her that she had acute chorea twelve years ago, and that the attack lasted severely for several months. A second attack occurred two years afterward, previous to the birth of the son who was now with her, and lasted during the whole term of gestation. She still has violent twitchings of the limbs, from which she has never been free since her second attack. She has hypermetropia $\frac{1}{10}$, and congestion of the optic disk and retina.

The boy Fred, ten years old, had chorea at birth, and has never been free from it. Has twitchings of the head, contortions of the face, jerking of the limbs, and winks incessantly; is subject to headaches, and cannot be continued in school more than three weeks at a time, as he becomes so excessively nervous. His sight = $\frac{2}{3}$, and he has a hypermetropic astigmatism of $\frac{1}{2}$.

Frank A., of Lowville, New York, who consulted me three years ago on account of intraocular hemorrhage of the right eye, called upon me, a few days since, to have the other examined, as it was giving him some pain. Observing that he was in a perpetual motion while speaking, I questioned him respecting the commencement of his nervous trouble, and was told that in the autumn of 1868 he had what was regarded as typhoid fever, and that when he recovered from the fever he had chorea. To use his own expression, he "was on hinges during the whole of the following winter," and, to all appearances, he has not been off them since. I found no indication of disease in his left eye, but hypermetropia $\frac{1}{30}$ existed.

Making a summary of these two series of cases, we have, in the first, 13 cases; in the second, 20 cases; total, 33 cases. Of these there is simple hypermetropia in 24 cases; hypermetropic astigmatism in 4 cases; myopic astigmatism in 4 cases;

unequal degrees of myopia in the two eyes in 1 case; total, 33 cases.¹

In one case apoplexy of the retina existed.

In one case intraocular hemorrhage had occurred, but not during the acute attack, and in three cases decided congestion of the optic disk and retina was found.

We come now to inquire whether, even allowing the coincidence of anomalies of refraction and chorea, it is reasonable to suppose that such erroneous refraction can be the exciting cause of so serious a derangement of the nervous and muscular functions.

I apprehend that it will not be at all difficult to convince medical men, familiar with the mischiefs wrought by erroneous refractions of the eyes, that the most serious nervous derangements may result from such causes. To the general practitioner, who sees less of these evils, this may be less apparent; but let such a practitioner who has himself normal eyes, and who is not himself yet presbyopic, attempt to read for half an hour with magnifying spectacles of sixteen or eighteen inches focal length, or let him study the landscape for a considerable time with a pair of glasses adapted to a near-sighted person, and he will soon, by his aching eyes, his nausea, and his vertigo, acknowledge that here is a cause of nervous disturbance of no slight or insignificant pretensions. And when we consider that convulsions and other serious and alarming nervous disturbances may be induced by the presence of worms in the intestines, or a hastily-devoured meal, or of a meal poorly digested, we cannot fail to perceive that this cause of irritation, prolonged through all the experience of the patient, is abundantly potent to such a result as chorea.

If we examine more closely the conditions of the eye in anomalous refraction, we shall be better prepared to understand the relations between them and disturbed nervous and muscular functions.

When the normal eye is at rest it has a clear and distinct vision of objects at a distance; that is, at twenty feet or more.

¹ For additional cases, see note at the conclusion of this paper.

As the object viewed approaches the eye, its refraction must be changed; otherwise the image would become dimmed and indistinct. The adjustment of the eye to different distances is performed, unconsciously to the individual, by the contraction of the ciliary muscle, through which the convexity of the crystalline lens is modified. The function by which the eye is thus adapted to different distances is called the function of accommodation. As the object viewed approaches more and more near, the ciliary muscle contracts more and more, until at a certain point it can contract no longer.

If a person with normal eyes brings the object very near them, and thus forces this muscle to unusual contraction, he finds that it soon fatigues, and he can no longer see the object well; for the maximum of the contractile power of this muscle soon exhausts itself.

In case of hypermetropia, clear and distinct vision, even of distant objects, can only be obtained by an effort of the accommodative faculty; hence, as the object approaches, the function of accommodation is more severely taxed than in normal eyes. It follows that, while normal eyes are always at rest when accommodated for distance, hypermetropic eyes are never at rest except when closed; and that, when viewing near objects, an excessive effort is required, and that this excessive effort is increased in proportion as the hypermetropia is more considerable.

Another important fact in this connection is, that, as the object viewed approaches, the eyes converge. This may be easily seen by any one who will watch the eyes of another before whom he moves a pencil or other object backward and forward, while the person observed fixes his eyes upon it.

The effort at accommodation and the effort at convergence are, therefore, simultaneous. They are also proportioned to each other; so that a pair of normal eyes accommodated for twelve inches are also converged for twelve inches; but, in the hypermetropic person the balance is lost, and such person who accommodates for twelve inches requires an exertion on the part of the ciliary muscle equal to accom-

modating the normal eye for a nearer point—we will say, for six inches. In such a case, a corresponding convergence of the eyes will take place, and so, while the eyes are accommodated for twelve inches, they are converged for six. Confusion of nervous and muscular action is the result, and to this confusion are due the pain, nausea, and vertigo of the average youth who attempts to read with his grandfather's spectacles, and this is the constant state of confusion of nerve and muscle in cases of anomalous refraction.

Let it also be borne in mind—and it is a point to which I am not aware that attention has been called—that young children have their eyes almost always accommodated for near objects. The baby has no interest in the landscape: he plays with his toes, he gazes admiringly at the raspy finger of his nurse Peggotty, held a foot from his nose, or he clinches his rattle in his tiny hands and stares at its glistening surfaces; at three, four, and five, he looks at pictures and toys; at six and seven he is sent to school, where he is forced to look at books, and it is only at a later period that he manifests much interest in distant objects.

Thus it is that in earliest years the ciliary muscle is in a constant state of extreme tension, and that in case of hypermetropia there is a perpetual conflict between this muscle of accommodation and the muscles of convergence, except, as it often happens, that there is a compromise by which one of the eyes agrees to a permanent squint, thus affording much relief to the little sufferer and great distress to its anxious parents.

It is while this irrepressible conflict is going on, and while the child with its impressible nature is suffering from this constant fatigue and irritation from muscles overtaken by extreme tension, and vexed by their failure to harmonize, that he is overworked at school, or is overtaken by measles or whooping-cough, or other infantile disease, and while thus debilitated is made an easy victim of the nervous irritation from which he has never been free. Or, perhaps, while on the verge of a loss of control over his muscles, a sudden fright

or disappointment becomes the last infliction beyond which the tired and exhausted nervous system can endure no more.

Another point remains for us to clear up: How are we to explain by such an hypothesis the phenomena observed by the distinguished Doctor Hughlings Jackson, and their absence as observed by others? This point seems to me to be most easily disposed of by our hypothesis. The functions of the ciliary muscle and those of the converging muscles are controlled by the third nerve, which has its deep origin in the region in which Dr. Jackson finds his lesions. To one acquainted with the phenomena of sympathetic ophthalmia the appearance of such lesions in such a locality will not, I apprehend, appear exceptional. Here an irritation resulting from a slight injury to the ciliary region of one eye, received perhaps years before, is transmitted backward, through the nerves supplying the ciliary muscle, to their deep origin and union with the nerves of the opposite side and forward along the corresponding nerves to the uninjured eye. The ciliary body of the uninjured eye becomes affected, the choroid and retina are subjected to degenerative changes and hemorrhages, and the sight is lost.

If, now, such changes may be induced in a previously healthy eye, by an irritation transmitted through two sets of nerves from the other eye, in which a minute foreign body may have been lodged, may not degenerations and lesions be also induced at the origin of these nerves as the result of continued irritation and vexation at their peripheral extremities.

Other arguments might easily be brought to prove the potency of such a peripheral irritation as that caused by anomalous refraction to induce the reflex phenomena of chorea, but I apprehend that enough has already been advanced to establish the proposition; and I have now to conclude this part of my subject with another proposition—a proposition which I have well considered and which I am prepared at the proper time to support with abundant facts and arguments, namely: That functional nervous diseases of all kinds are, beyond any

and all other causes combined, dependent upon anomalous refraction of the eyes.

Even if time allowed I need say but little respecting the treatment of chorea. The first and great indication is to correct the faulty refraction by the use of proper glasses. This will often, according to my own experience, relieve the patient at once. If glasses for any reason cannot be supplied or used, the child's eyes may be covered, for it is a well-known fact that when the patient with chorea sleeps the choreic movements often cease; this is doubtless because the eyes are at rest.

The Calabar bean has of late years been found of value in the treatment of chorea; and, when we remember that its peculiar and characteristic effect is to stimulate the ciliary muscle, we shall see that its use is rational.

As children and others suffering from chorea usually also suffer from general want of vigor, tonics, chalybeates, and arsenic are generally indicated.

I have thus, Gentlemen of the Academy of Medicine, endeavored to present my views of what seems to me to be a most important subject.

I rejoice at the opportunity of submitting these views to a body of physicians so distinguished as this, for I know that if there are errors in my reasonings or observations you will detect them, and that you will prove the correctness of this doctrine if it is founded in reason; and I dare to hope that this explanation of what has been a most obscure subject may not only be accepted, but that this line of investigation may throw light upon some other obscure nervous diseases.

NOTE.—*June 26th.* Since reading this paper before the ACADEMY OF MEDICINE, June 15th, I have examined eight other subjects of chorea with the following results:

Case I. W. V. O., Hypermetropia $\frac{1}{25}$.

" II. M. M., Hypermetropic astigmatism $\frac{1}{12}$.

" III. M. T., Hypermetropia $\frac{1}{30}$ + astigmatism $\frac{1}{60}$.

" IV. N. L., Myopic astigmatism $\frac{1}{12}$.

" V. K. H., Hypermetropia $\frac{1}{14}$.

Case VI. Miss T., Hypermetropia $\frac{1}{18}$.

" VII. Mrs. W., Myopia, right $\frac{1}{32}$, left $\frac{1}{8}$.

" VIII. J. T., Myopia $\frac{1}{12}$ and $\frac{1}{14}$.

Adding these to the cases above reported and we have forty-one cases of chorea, in every one of which anomalous refraction occurs, as follows: hypermetropia 27; hypermetropic astigmatism 6; myopic astigmatism 5; unequal degrees of myopia 3; total, 41.

